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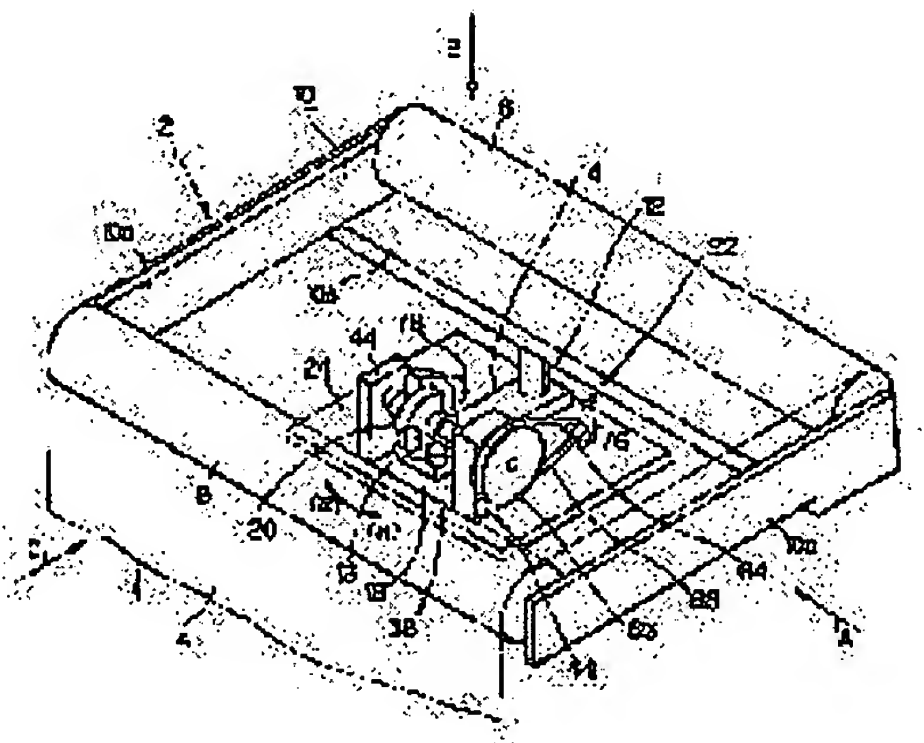
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(22)Date of filing : 24.05.1995 (72)Inventor : NISHIMURA TAKAO

(54) ROLL GUIDER

(57)Abstract:

PURPOSE: To high accurately control a lug end position of a sheet further to simplify a power transmitting mechanism, by eliminating backlash related to the power transmitting mechanism, in a roll guider.

CONSTITUTION: A roll guider 2 comprises a pair of inlet/outlet rolls 7, 8 of receiving the halfway part of a running sheet 4, roll frame 10 of holding the inlet/outlet rolls 6, 8 and a support point shaft 12 of supporting a sheet width direction almost central part in a rear part of the roll frame 10, to correct meandering the sheet 4 by a side of the outlet roll 8. The guider comprises an arm 14 fixed with one end part to the support point shaft 12 also swiveled to turn the roll frame 10, pair of cam followers 16, 18 juxtaposed in the other end part of the arm 14, helical rib cam 20 interposed with both side surfaces by a pair of the cam followers 16, 18 further turned to swivel the arm 14 through a pair of the cam followers 16, 18 and a drive means 22 of turning the rib cam 20.



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CLAIMS

[Claim(s)]

[Claim 1] Roll GAIDA mainly correct meandering of the aforementioned sheet at an aforementioned outlet roll side by having the entrance roll and the outlet roll of a couple which is characterized by to provide the following, and which receives a portion in the middle of the sheet it runs, the roll frame which hold free [rotation of this entrance roll and outlet roll], and the rocking lever shaft which support in the sheet cross-direction abbreviation center section in the posterior part of this roll frame, and making it circle in the aforementioned roll frame centering on this rocking lever shaft The arm which it rocks [arm] while the end section is fixed to the aforementioned rocking lever shaft, and makes it circle in the aforementioned roll frame The cam follower of the couple installed by the other end of this arm The spiral rib cam which a both-sides side is inserted [cam] into the cam follower of this couple, and it rotates [cam], and makes the aforementioned arm rock through the cam follower of the aforementioned couple Driving means which rotate this rib cam

[Claim 2] Roll GAIDA according to claim 1 characterized by enabling adjustment of the clearance of the cam follower of the aforementioned couple by constituting at least one side of the cam follower of the aforementioned couple from an eccentricity type cam follower.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to roll GAIDA.

[0002]

[Description of the Prior Art] Generally in the processing line of various sheets, the deckle edge position of the sheet it runs is controlled using roll GAIDA, and the quality roll to which the deckle edge was equal by this is made to be obtained. The perspective diagram of conventional roll GAIDA is shown in drawing 11 .

[0003] This roll GAIDA a For example, entrance roll c and the outlet roll d of a couple which receives a portion in the middle of the sheet b it runs by being used for meandering correction of the film sheet in a restoration packer The roll frame e held free [rotation of these entrance roll c and the outlet roll d] Meandering of Sheet b is mainly corrected by the outlet roll d side by having the rocking lever shaft g supported by Base f, while supporting the sheet cross direction abbreviation center section in the posterior part of the roll frame e, and making it circle in the roll frame e centering on a rocking lever shaft g.

[0004] This roll GAIDAa is equipped with the ball screw equipment i connected with the operation shaft h connected with the right-and-left end in roll frame e anterior part, and this operation shaft h, and control-motor k which operates this ball screw equipment i through distributor shaft coupling j. Ball screw equipment i mainly consists of nuts n of a cylindrical shape with which the back end section was screwed in the ball screw m connected to distributor shaft coupling j, and this ball screw m, and the front end section was connected with the operation shaft h.

[0005] Thus, according to constituted conventional roll GAIDA a, rotation of control-motor k is first transmitted by the ball screw m through distributor shaft coupling j. Since rotation is regulated with the operation shaft h at the nose of cam, Nut n moves to the shaft orientations of the ball screw m by rotation of the ball screw m, and moves the operation shaft h. Thereby, the roll frame e circles to the longitudinal direction shown in drawing 11 centering on a rocking lever shaft g, corrects only desired movement magnitude towards a request of Sheet a in the outlet roll d, and controls the deckle edge position of Sheet b.

[0006]

[Problem(s) to be Solved by the Invention] However, in conventional roll GAIDA a, since ball screw equipment i is adopted as a power transmission device, there is a trouble of (A) - (C) shown below.

(A) This backlash cannot be adjusted, although it is a general-purpose type thing and about 0.1mm shaft-orientations backlash exists between the ball screw m and Nut n.

(B) Since Nut n has backlash also in the direction of a slant face of a screw thread to the ball screw m, as it is shown in drawing 12 , in order to lose the backlash of the shaft diameter direction of Nut n, a slide guide q is needed. Therefore, there are many part mark, and a mechanism is complicated while influence attains to cost.

(C) If Nut n separates from the ball screw m, there will be a possibility that the ball inside nut n may be omitted, and processing of each part article, an assembly, and maintenance will take cautions.

this invention is made in view of aforementioned trouble [conventional] (A) - (C), loses the backlash concerning a power transmission device, and controls the deckle edge position of a sheet by high precision, and can attain simplification of a power transmission device, and aims at offering roll GAIDA which can moreover be easily performed also about maintenance.

[0007]

[Means for Solving the Problem] this invention has the following composition in order to attain the aforementioned purpose. Namely, the entrance roll and outlet roll of a couple which receives a portion in the middle of the sheet as for which invention of a claim 1 runs, By having the roll frame held free [rotation of this entrance roll and outlet roll] and the rocking lever shaft which supports the sheet cross direction abbreviation center section in the posterior part of this

roll frame, and making it circle in the aforementioned roll frame centering on this rocking lever shaft In roll GAIDA which mainly corrects meandering of the aforementioned sheet by the aforementioned outlet roll side The arm which it rocks [arm] while the end section is fixed to the aforementioned rocking lever shaft, and makes it circle in the aforementioned roll frame, The spiral rib cam which a both-sides side is inserted [cam] into the cam follower of the couple installed by the other end of this arm, and the cam follower of this couple, and it rotates [cam], and makes the aforementioned arm rock through the cam follower of the aforementioned couple, It is roll GAIDA characterized by having the driving means which rotate this rib cam.

[0008] Moreover, invention of a claim 2 is roll GAIDA according to claim 1 characterized by enabling adjustment of the clearance of the cam follower of the aforementioned couple by constituting at least one side of the cam follower of the aforementioned couple from an eccentricity type cam follower.

[0009]

[Function] When the aforementioned rib cam rotates in the predetermined direction by the aforementioned driving means, the cam follower of the couple which restrains the both-sides side of this rib cam makes the aforementioned arm rock with rotation of a rib cam according to invention of a claim 1. If an arm rocks, the rocking lever shaft connected with the arm will rotate, and the anterior part of the aforementioned roll frame will circle crosswise [sheet] centering on this rocking lever shaft. The sheet concerning the outlet roll moves in the predetermined direction in the cross direction by this, and the deckle edge position of a sheet is corrected.

[0010] Therefore, backlash reduction by the cam mechanism can be aimed at compared with the conventional thing which adopted ball screw equipment. And since only the part which does not have parts, such as a slide guide, at least can simplify a power transmission device, an assembly etc. becomes easy. Moreover, it becomes unnecessary [the cautions to the ball defluxion in ball screw equipment like before].

[0011] moreover, according to invention of a claim 2, the cam follower of a couple is certainly made close to the both-sides side of a rib cam by adjusting the clearance of the cam follower of the aforementioned couple -- things can be carried out Therefore, the backlash between a rib cam and a cam follower can be lost easily. Moreover, as a result of operating for a long period of time, even when backlash occurs between a rib cam and a cam follower, backlash can be easily reduced by adjusting an aforementioned eccentricity type cam follower again.

[0012]

[Example] Hereafter, one example of this invention is explained with reference to a drawing. In addition, roll GAIDA of this invention means meandering correction control units, such as a film sheet in various packaging machinery, such as a restoration packer and a pyro packer. Entrance roll 6 and the outlet roll 8 of a couple which receives a portion in the middle of the sheet 4 it runs as roll GAIDA 2 of this example is shown in drawing 1 , By having the roll frame 10 held free [rotation of entrance roll 6 and the outlet roll 8] and the rocking lever shaft 12 which supports the sheet cross direction abbreviation center section in the posterior part of the roll frame 10, and making it circle in the roll frame 10 centering on a rocking lever shaft 12 The arm 14 which meandering of a sheet 4 is corrected by the outlet roll 8 side, it rocks [arm] while the end section is fixed to a rocking lever shaft 12, and makes it circle in the roll frame 10, The cam followers 16 and 18 of the couple installed by the other end of an arm 14, It has the spiral rib cam 20 which a both-sides side is inserted [cam] into the cam followers 16 and 18 of a couple, and it rotates [cam], and makes an arm 14 rock through the cam followers 16 and 18 of a couple, and the driving means 22 which rotate the rib cam 20.

[0013] The composition of each part is explained in detail. In addition, in this example, the left-hand side and right-hand side in the sheet cross direction when the left and the right look at the entrance roll 6 side from the outlet roll 8 side are said.

[0014] As shown in drawing 1 , entrance roll 6 and the outlet roll 8 separate a predetermined roll span, and is arranged in parallel. The roll frame 10 mainly consists of connecting-plate 10b which connected with right and left the back end of the side plates 10a and 10a of the right-and-left couple which holds entrance roll 6 and the outlet roll 8 free [rotation of each both ends], and these two side plates 10a and 10a.

[0015] The aforementioned rocking lever shaft 12, an arm 14, cam followers 16 and 18, the rib cam 20, and driving-means 22 grade are contained in the case 26 put on the base 24, as shown in drawing 2 . As shown in drawing 2 , the upper-limit side connected the rocking lever shaft 12 with the inferior-surface-of-tongue center section of connecting-plate 10b of the roll frame 10 through the circular support board 28, and it is caudad projected in the posterior part within a case 26. The susceptor 30 fixed to the base 24 is installed in the posterior part within a case 26, and the bearing housing 34 with which the ball bearings 32 and 32 of the vertical couple which supports a rocking lever shaft 12 free [rotation] were incorporated is put firmly on this susceptor 30.

[0016] As shown in drawing 2 and drawing 3 , an arm 14 presents an abbreviation rectangle longwise forward and backward by plane view, and is put firmly on the soffit section of a rocking lever shaft 12 with bolt 14a, and when it is in a criteria position, it extends in a cross direction along the base 24 upper surface. Cushions 36 and 36 are stuck on

the right-and-left both-sides side in the front end section of an arm 14.

[0017] As cam followers 16 and 18 protrude on the front end upper surface of an arm 14 together with right and left as shown in drawing 4 , and shown in drawing 5 It mainly consists of bolts 16a and 18a which insert in an arm 14 in the vertical direction, nuts 16b and 18b screwed on the soffit section of Bolts 16a and 18a, and ball bearings 16c and 18c attached in the upper-limit section of Bolts 16a and 18a.

[0018] The right-hand side cam follower 18 is supplied by the well-known eccentricity type cam follower among these cam followers 16 and 18. That is, as shown in drawing 5 , the center C1 of the standard section inserted in the male screw section and the arm 14 of bolt 18a carries out eccentricity of the eccentricity type cam follower 18 slightly to the center C2 of a portion that ball bearing 18c is attached. And it is on the aforementioned center C1, and the hexagon socket 18a1 is formed in the upper limit of bolt 18a.

[0019] The rib cam 20 is spirally formed in the surroundings of the medial axis C3 prolonged in a longitudinal direction, as shown in drawing 3 . As shown in drawing 4 , the boss section of the rib cam 20 is fixed to a cam shaft 38 by stop screw 40a or key 40b. As shown in drawing 6 (a) and ** (b), when it is formed in the circumference of the aforementioned medial axis C3 at the range of about 360 degrees and an arm 14 is in a mid gear (i.e., when the roll frame 10 is in a criteria position), the rib cam 20 is restrained by the cam followers 16 and 18 of a couple in the longitudinal-direction center section, as shown in drawing 6 (a).

[0020] moreover, the cam followers 16 and 18 which carry out movable as shown in drawing 6 (a) -- respectively, the rib cam 20 needs the thing which go to right-and-left ends from the center section and which is designed so that it is alike, and may follow and may become thin so that the side of the rib cam 20 may always be contacted also in which position in the side of the rib cam 20 In this case, the width-of-face size W2 of the right-and-left ends of the rib cam 20 will become smaller than the width-of-face size W1 of a center section.

[0021] A cam shaft 38 is supported by the susceptors 44 and 44 of the right-and-left couple equipped with the ball bearing 42 free [rotation], as shown in drawing 4 . The stopper bolts 48 and 48 which the amount of protrusions can adjust by locknuts 46 and 46 protrude on the part which faces the aforementioned cushion 36 in these susceptors 44 and 44. The rocking range of the longitudinal direction of an arm 14 is mechanically regulated by making the nose of cam of the stopper bolts 48 and 48 contact cushions 36 and 36.

[0022] As shown in drawing 3 , 1st cam 50a, 3rd cam 50c, 4th cam 50d, and 2nd cam 50b are prepared in the left end section of a cam shaft 38 one by one towards an outside from the inside. It corresponds to these [1st] - the 4th cam 50a, 50b, and 50c, the 1st by which 50d of each was fixed to the base 24 through the bracket 52 - the 4th limit switch 54a, 54b, 54c, and 54d. Each the 1st - limit switch [4th / 54a, 54b, 54c, and 54d] lead wire is connected to the connection terminal 56 installed in the base 24.

[0023] Drawing 7 (a) - ** (b) Each cams 50a-50d and each limit switches 54a-54d in the state where an arm 14 is in each in a criteria position are shown. the [4th limit switch of two centers 54d, and] -- 3 limit-switch 54c is in an operating state, as shown in drawing 7 (b) and ** (c), and it functions as an object for the alignment of an arm 14 On the other hand, as a fictitious outline shows to drawing 3 , when an arm 14 rotates leftward and is located most in left-hand side, 2nd limit switch 54b of most left-hand side will be from the state shown in drawing 7 (a) in an operating state by 2nd cam 50b, and regulates rotation of the arm 14 beyond it. Moreover, as a fictitious outline shows to drawing 3 , when an arm 14 rotates rightward and is located most in right-hand side, 1st limit switch 54a of most right-hand side will be from the state shown in drawing 7 (d) in an operating state by 1st cam 50a, and regulates the rotation range in the right of an arm 14.

[0024] The control motor 60 which has been arranged between a rocking lever shaft 12 and the rib cam 20, and was connected to the connection terminal 56 as driving means 22 were shown in drawing 3 , The reducer 62 connected with the control motor 60, and the drive pulley 64 of the minor diameter fixed to output-shaft 62a of a reducer 62, It is wound around the follower pulley 66, and the drive pulley 64 and the follower pulley 66 of the major diameter fixed to the axis end section on the right-hand side of a cam shaft 38, and mainly consists of belts 68 which transmit the power of a control motor 60 to a cam shaft 38.

[0025] Then, the web guide system equipped with aforementioned roll GAIDA 2 is explained with reference to drawing 8 , and an operation of roll GAIDA 2 is explained further.

[0026] As shown in drawing 8 , this web guide system mainly consists of aforementioned roll GAIDA 2, the winding roll 70 which rolls round the sheet 4 which passed through this roll GAIDA 2, and two or more idle rolls 72. And this web guide system is equipped with the sensors 74 and 74 of the right-and-left couple which detects the variation rate of the sheet deckle edge position immediately after passing along the outlet roll 8 of roll GAIDA 2. These sensors 74 and 74 are equipped with the light sources, such as a lamp, and photo-detector 74a (refer to drawing 9), such as an optoelectric transducer (Cds), and send a signal to a control panel 80. In addition, the control panel 80 and the aforementioned connection terminal 56 of this exterior are connected by the set cable 58 (refer to drawing 3).

[0027] the variation rate which the deckle edge position of the sheet 4 it runs shows to drawing 9 (b) by this web guide system -- the variation rate of the sheet 4 detected by the sensor 74 when it displaced to the longitudinal direction to the criteria position of zero, as shown in drawing 9 (a) or ** (c) -- the variation rate of the sheet 4 detected by it by the sensor 74 while the correction direction of a control motor 60 was determined by the direction -- the corrected speed of the control motor 60 according to the amount is decided

[0028] For example, if it displaces rightward by meandering of the sheet 4 it runs as the deckle edge position of a sheet 4 shows drawing 9 (c) to the criteria position of displacement zero, a drive motor 60 will rotate by the predetermined corrected speed in the direction shown with a sign 76 as shown in drawing 1 . The power of this drive motor 60 is transmitted to a cam shaft 38 through the drive pulley 64, a belt 68, and the follower pulley 66, and is rotated in the direction which shows the rib cam 20 with a sign 78. Since the both-sides side of the rib cam 20 is restrained by the cam followers 16 and 18 of a right-and-left couple, an arm 14 is rocked leftward on the level surface centering on a rocking lever shaft 12 with rotation of the rib cam 20. Since it is connected in [this arm 14, and rocking lever shaft 12 and a roll frame 10] one, entrance roll 6 and the outlet roll 8 also come to circle leftward. Therefore, it is mainly compulsorily moved leftward by revolution of the left of the outlet roll 8, and the deckle edge of the sheet 4 which was being displaced rightward which is shown in drawing 9 (c) is controlled to return to the criteria position shown in drawing 9 (b).

[0029] Control of the deckle edge position of this sheet 4 is similarly performed, when a deckle edge position displaces leftward to a criteria position (refer to drawing 9 (a)). In this case, the hand of cut of a control motor 60 or the rib cam 20 and the revolution direction of entrance roll 6 and the outlet roll 8 turn into direction opposite to the case where the aforementioned deckle edge position displaces rightward, and also move a sheet 4 rightward.

[0030] In addition, the corrected speed of the drive motor 60 determined with the amount of displacement of a sheet 4 is set up so that it may become so quick that the amount of displacement of a sheet 4 is large as shown in drawing 10 , and even when the deckle edge position of a sheet 4 shifts greatly, it can correct a deckle edge position promptly.

[0031] As mentioned above, according to this example, compared with the ball screw equipment adopted conventionally, backlash reduction by the cam mechanism can be aimed at, a power transmission device simplifies only the part which moreover does not have parts, such as a slide guide, and an assembly etc. becomes easy. Moreover, the cautions to the ball defluxion in ball screw equipment like before are also unnecessary.

[0032] moreover, the cam followers 16 and 18 of a couple are certainly made close to the both-sides side of the rib cam 20 by adjusting the clearance of the cam followers 16 and 18 of a couple -- things can be carried out That is, as shown in drawing 5 , before fixing by nut 18b at the time of attachment of the right-hand side eccentricity type cam follower 18, the clearance of BORUBE ring 18c of a cam follower 18 and BORUBE ring 16c of a cam follower 16 can be adjusted by turning bolt 18a using the hexagon-head wrench 82. Therefore, an operator can lose easily the backlash between the rib cam 20 and the cam followers 16 and 18 of a couple by binding nut 18b tight, after the opposed face of BORUBE ring 16a and BORUBE ring 18a changes the rib cam 20 into the state [be / no crevice] of inserting good.

[0033] Moreover, as a result of operating for a long period of time, when backlash occurs between the rib cam 20 and the cam followers 16 and 18 of a couple, this backlash can also be easily reduced by adjusting the eccentricity type cam follower 18 again.

[0034] In addition, this example is the mode of suitable operation of this invention, and the technical range of this invention is not limited to this example at all.

[0035]

[Effect of the Invention] While according to this invention as the above explanation being able to lose the backlash concerning a power transmission device in roll GAIDA and being able to control the deckle edge position of a sheet by high precision, a power transmission device can be simplified and, moreover, it can carry out easily also about maintenance.

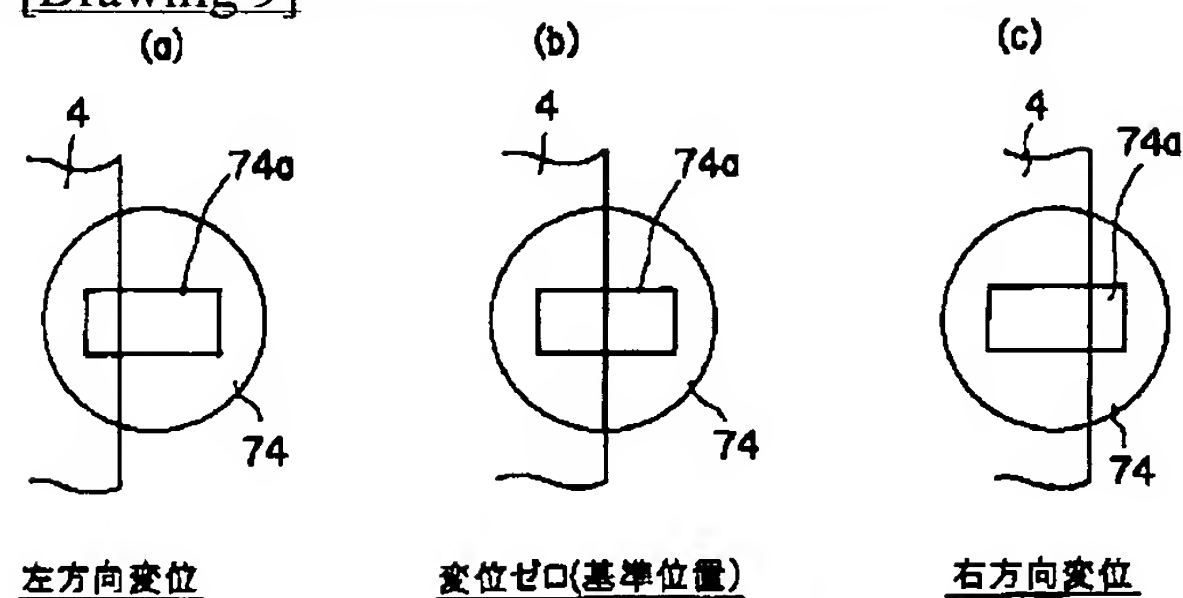
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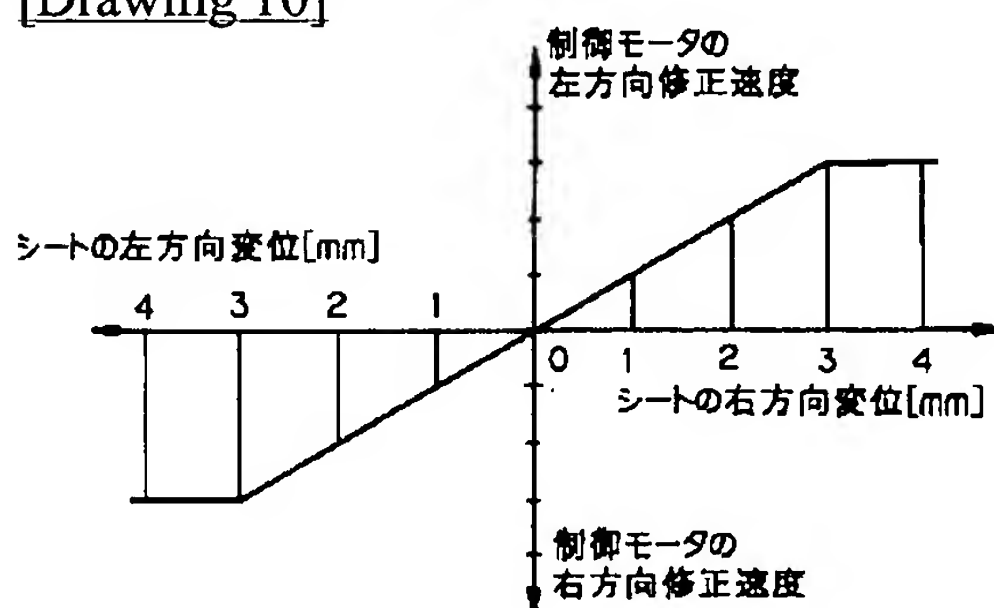
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DRAWINGS

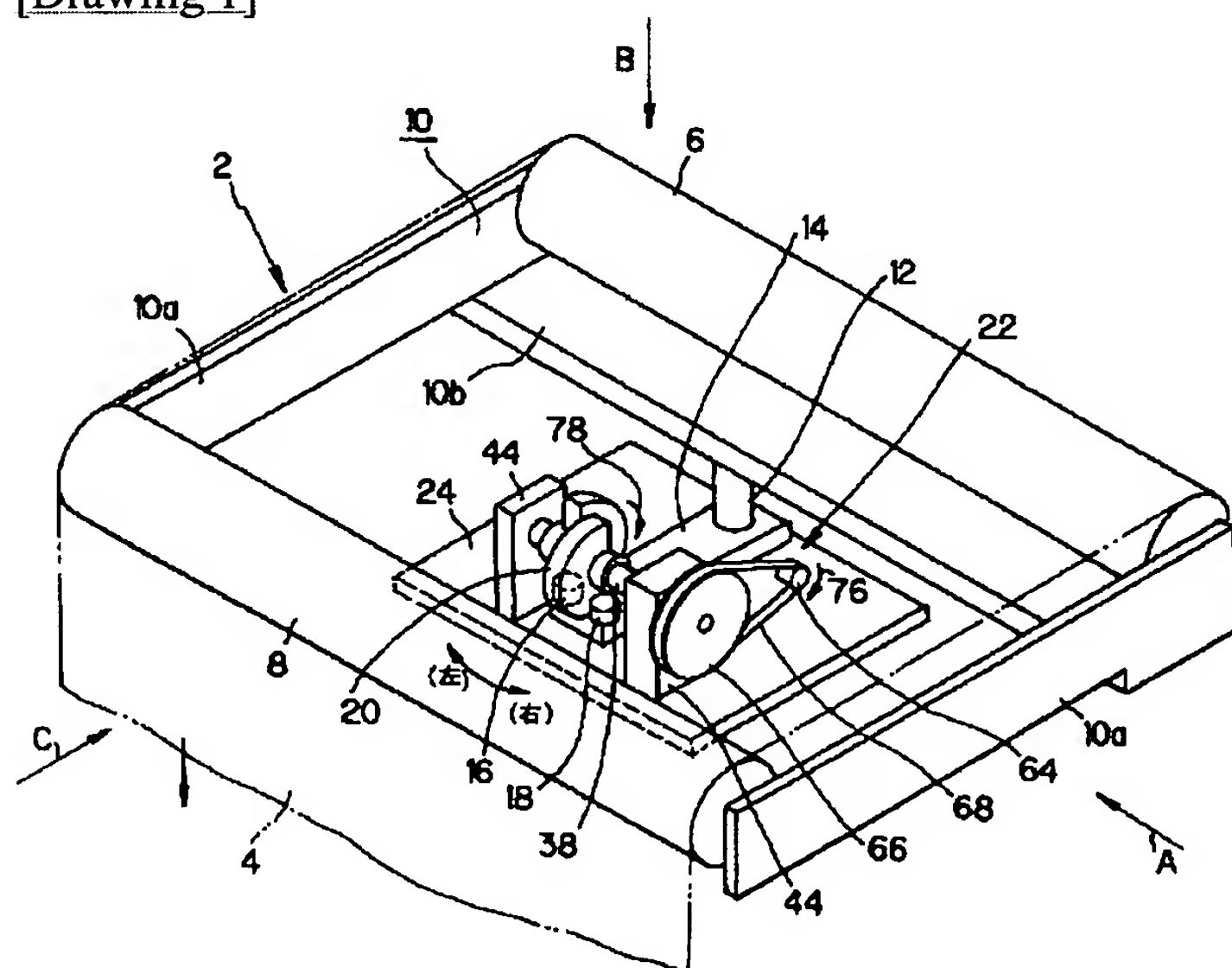
[Drawing 9]



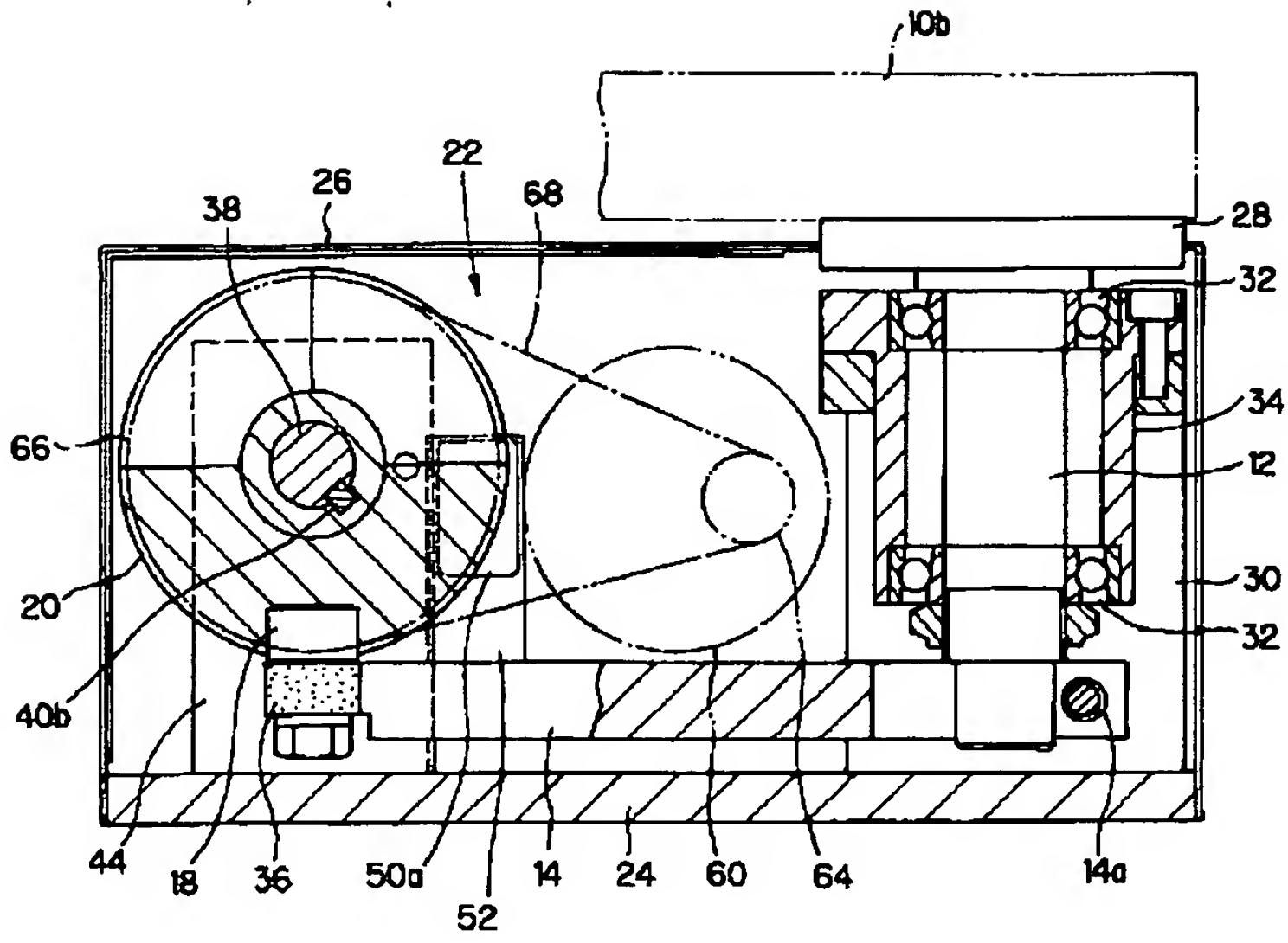
[Drawing 10]



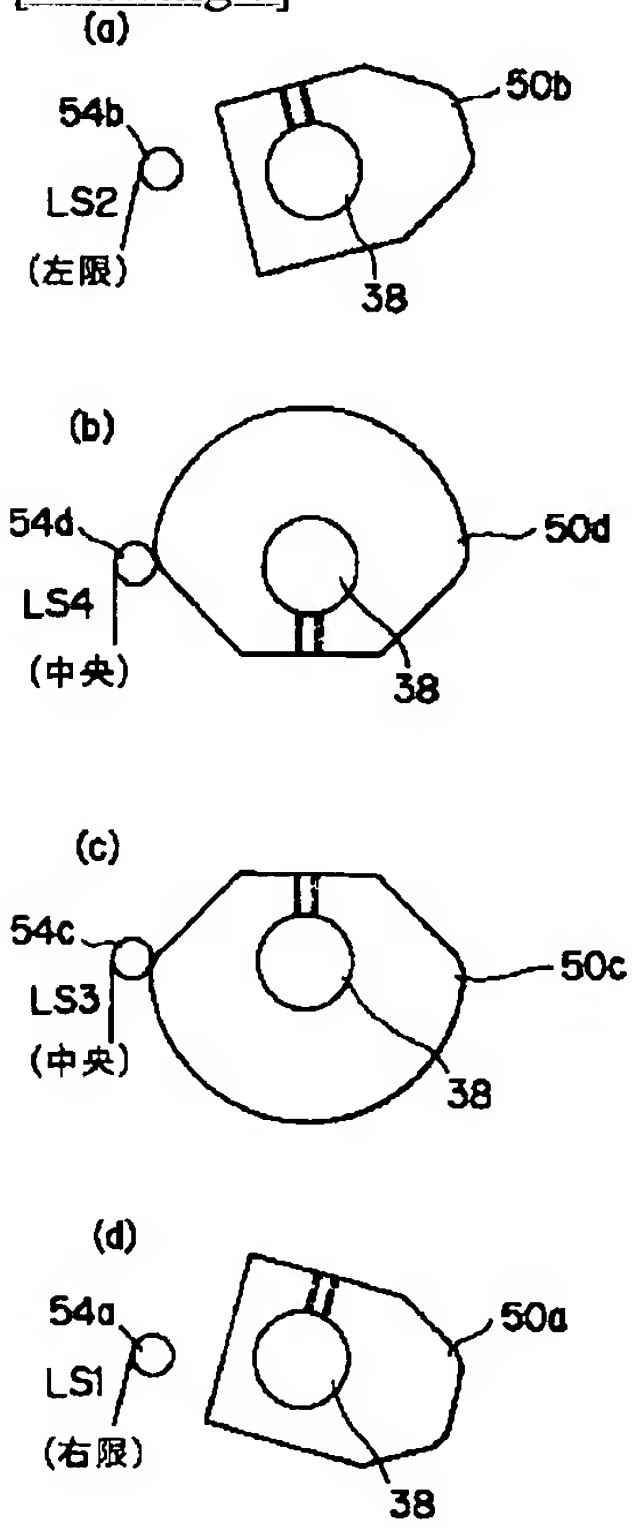
[Drawing 1]



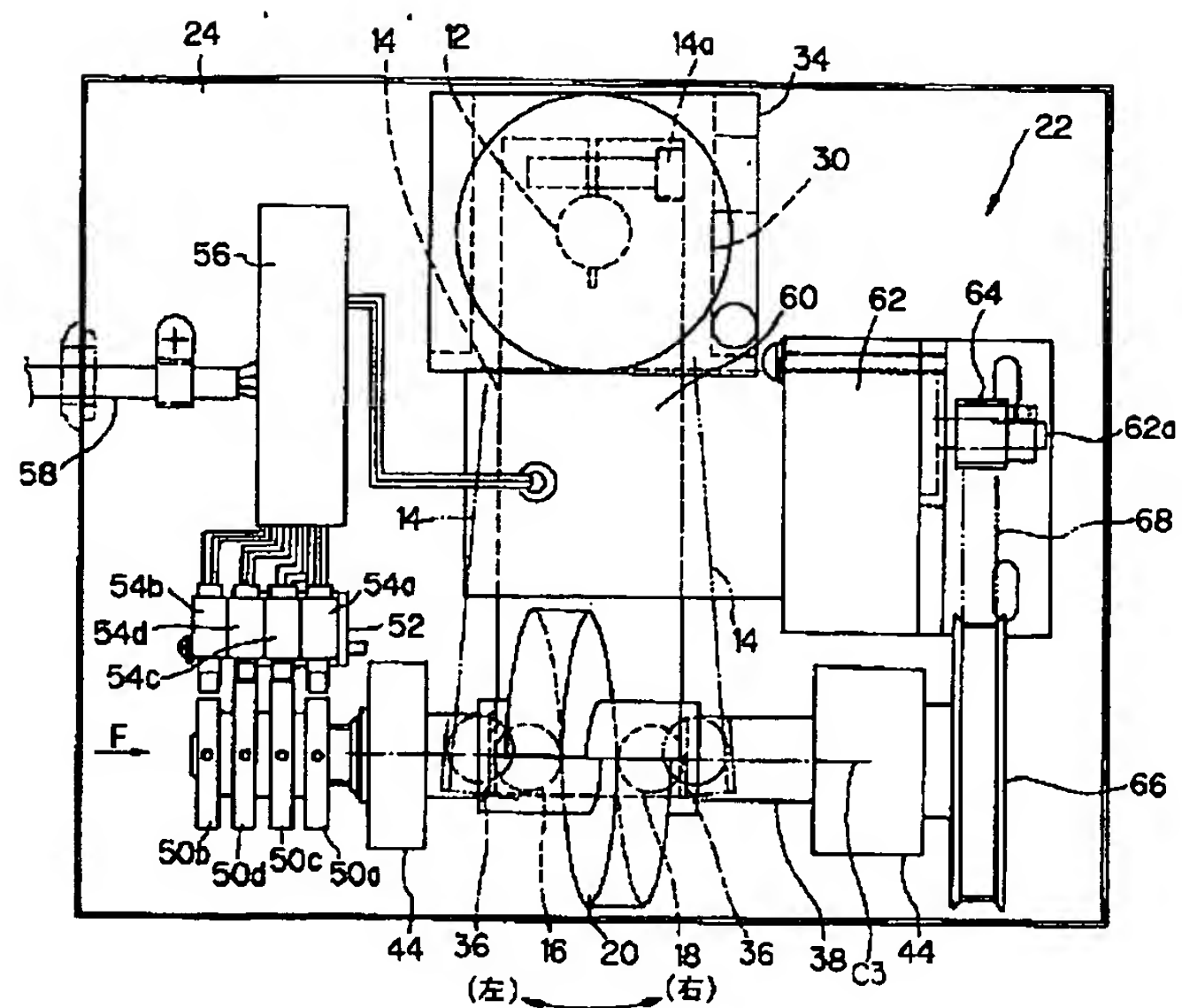
[Drawing 2]



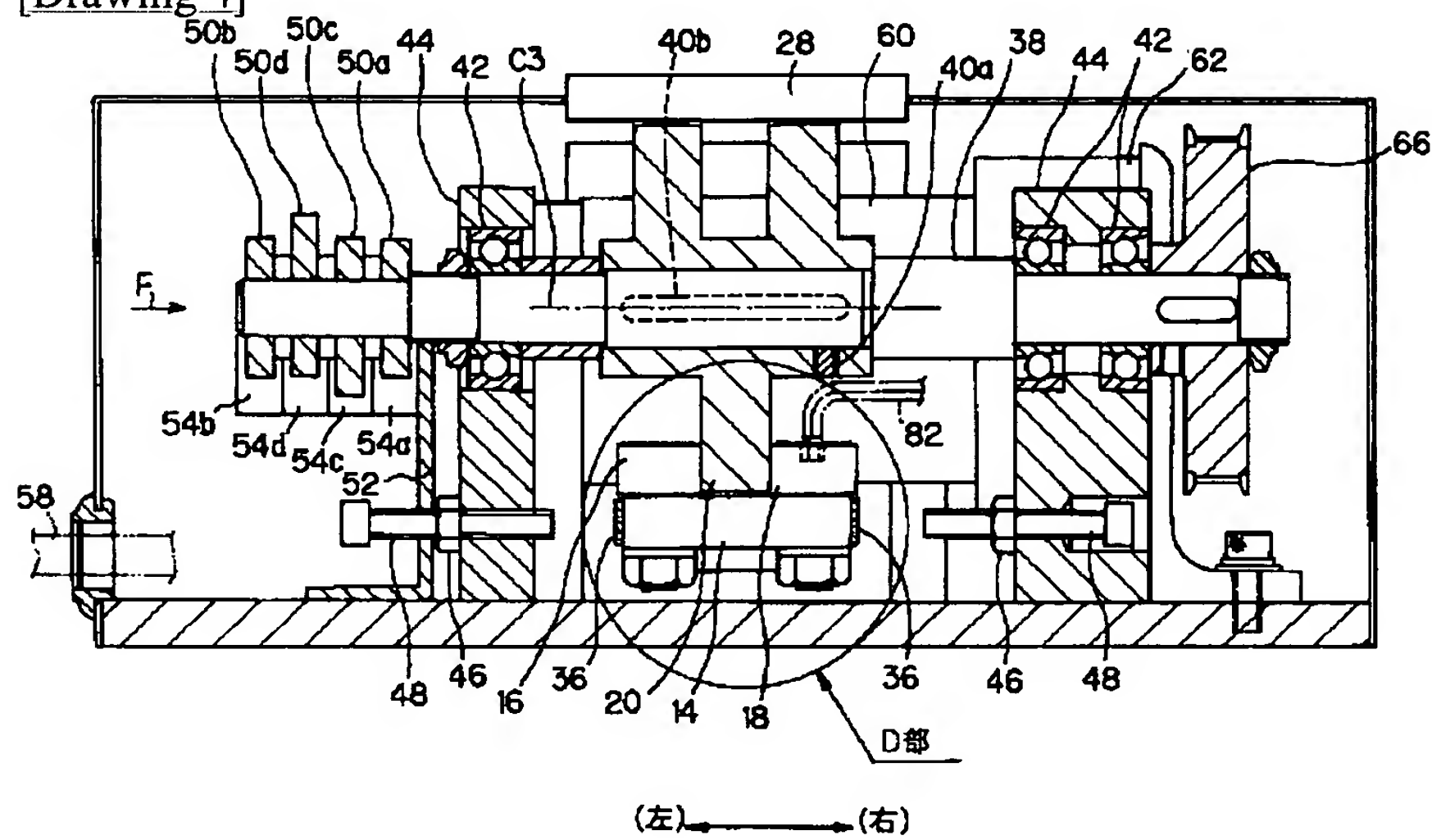
[Drawing 7]



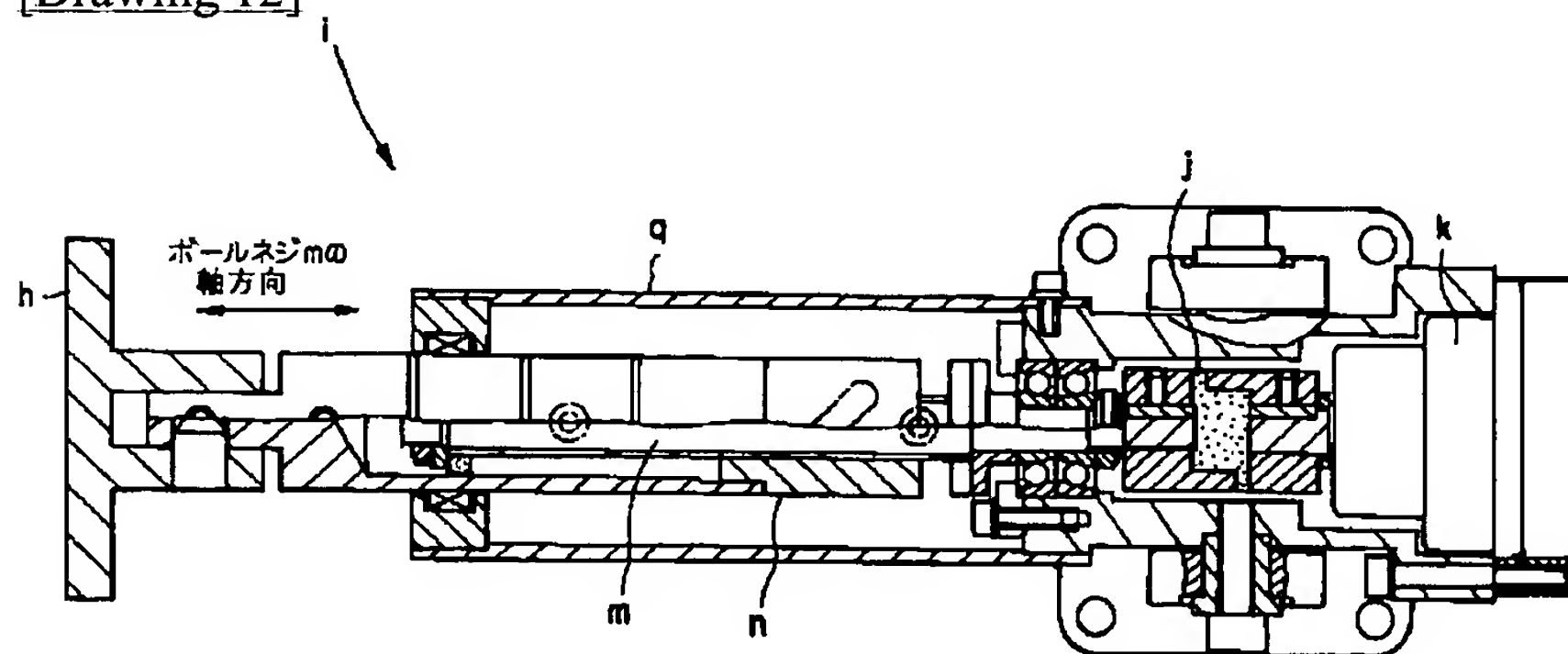
[Drawing 3]



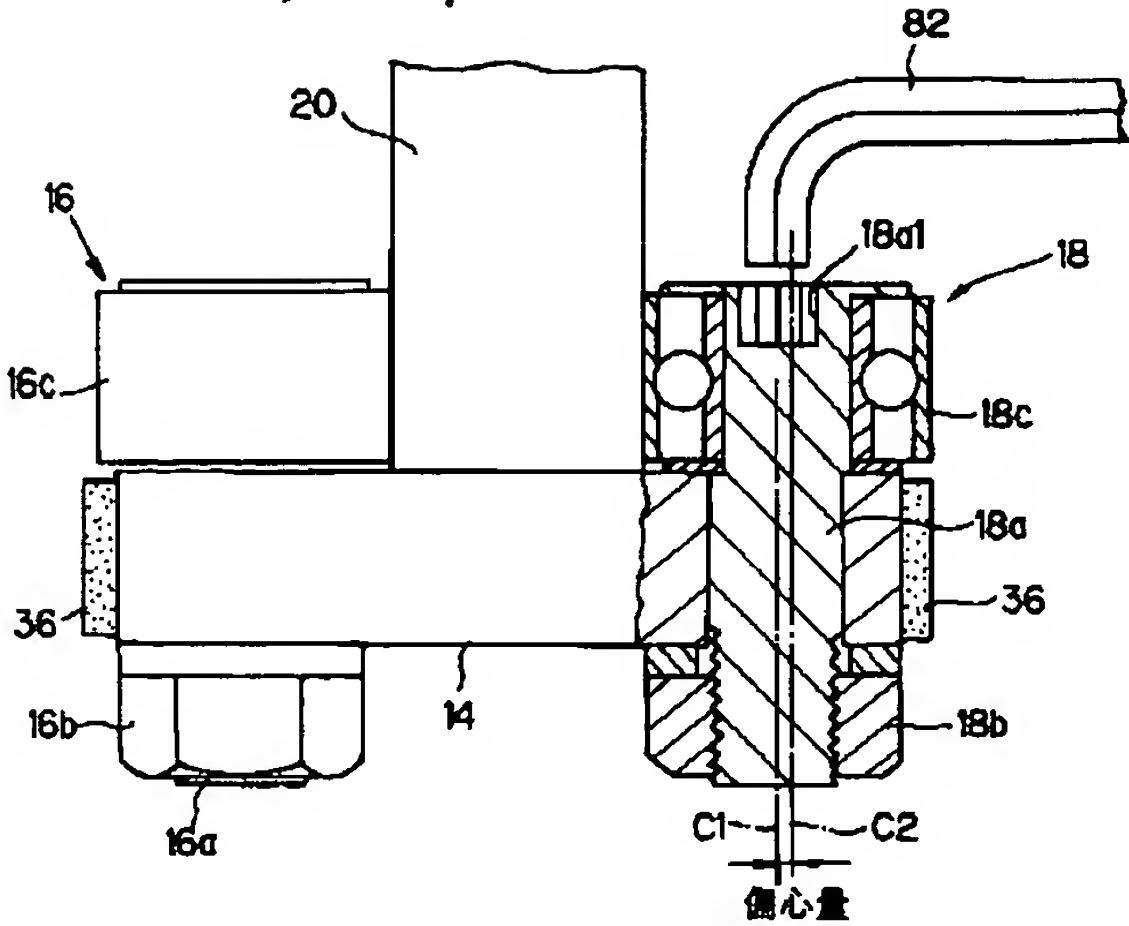
[Drawing 4]



[Drawing 12]



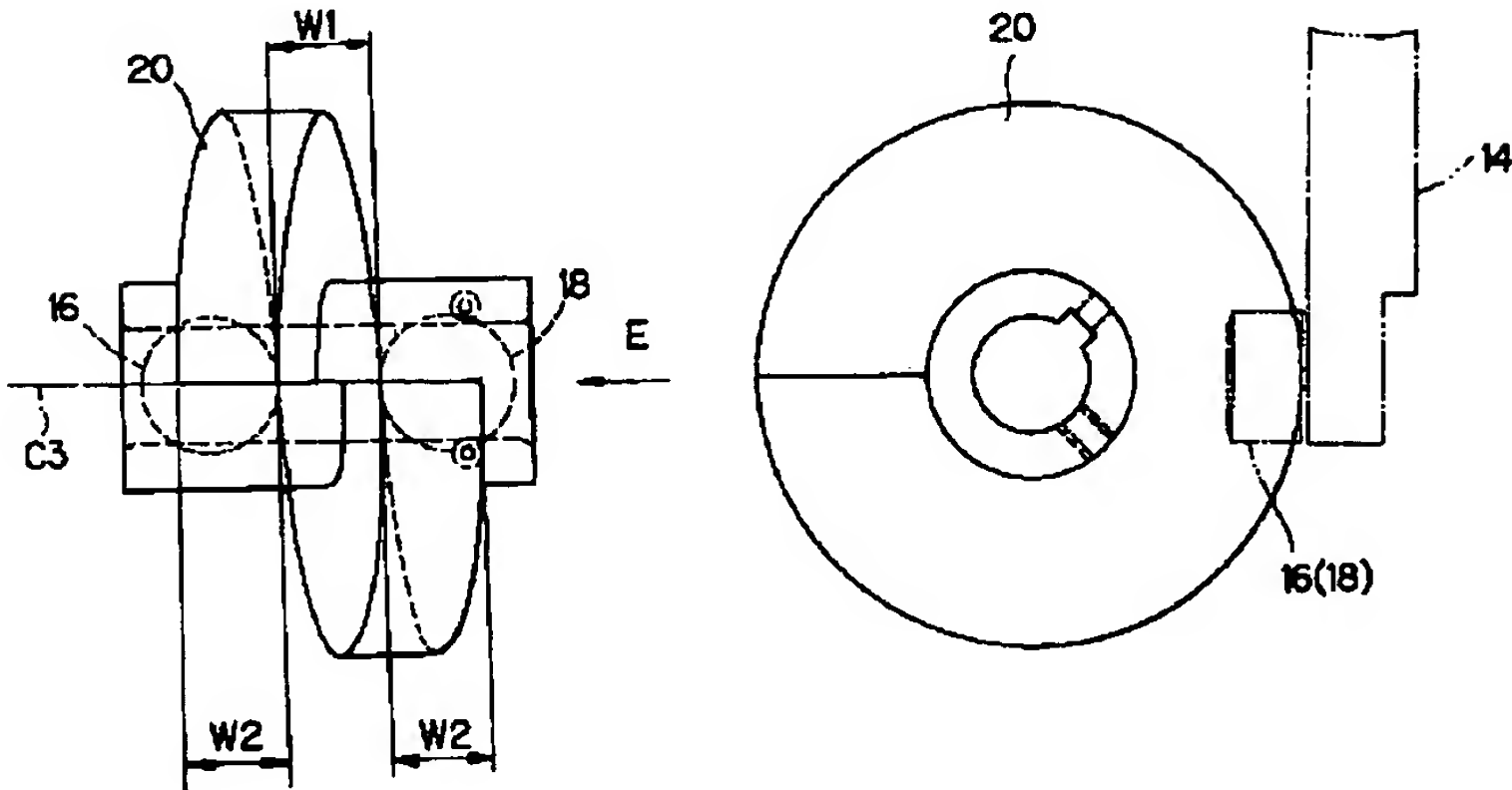
[Drawing 5]



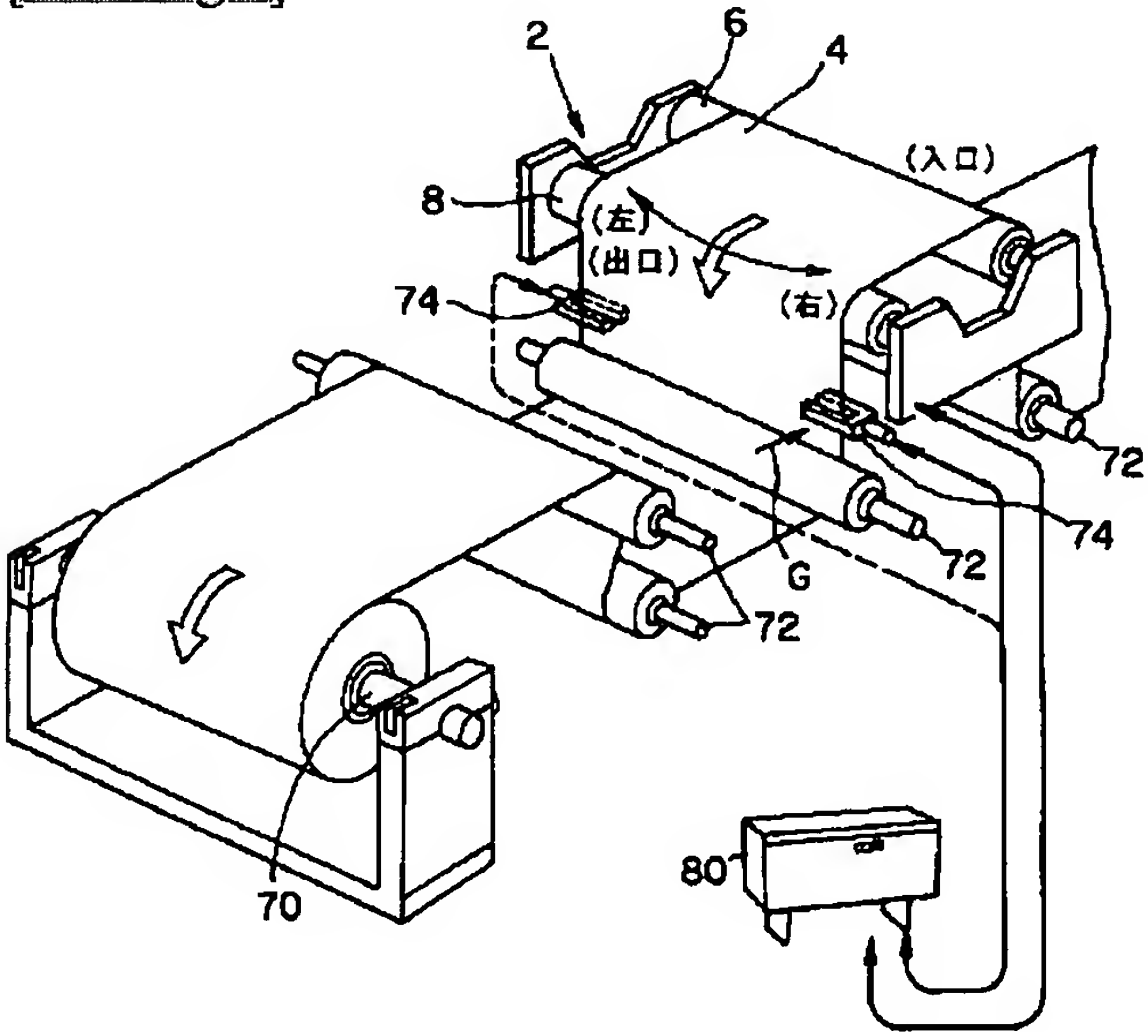
[Drawing 6]

(a)

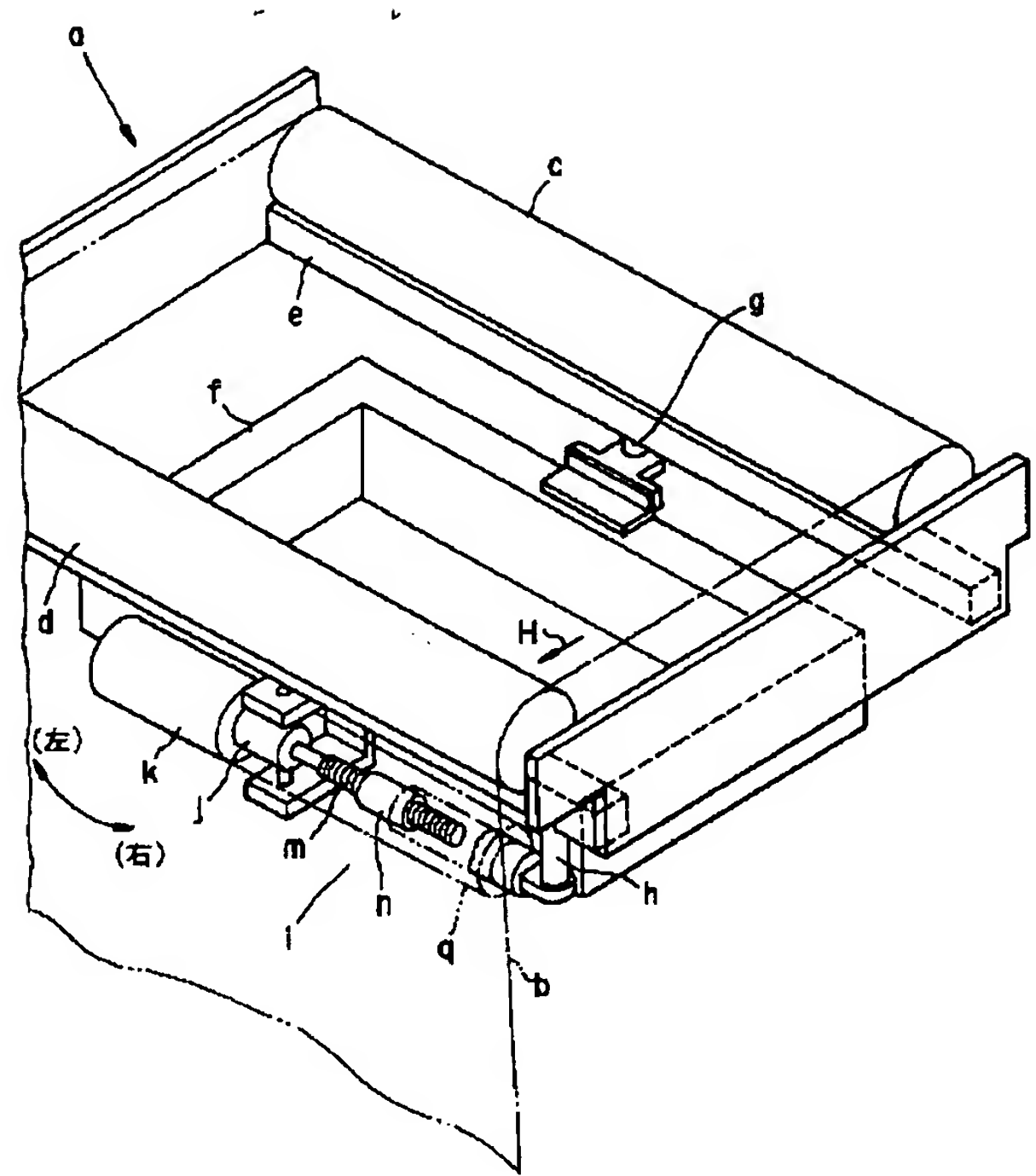
(b)



[Drawing 8]



[Drawing 11]



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